

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P. O. Box 272400
Fort Collins, Colorado 80527-2400

IFW 001
PATENT APPLICATION

ATTORNEY DOCKET NO. 10003472-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Patricia A. Beck et al

FAX RECEIVED

Confirmation No.: 4353

Application No.: ~~10/001576~~ 10/001756

APR 24 2006

Examiner: J.S.Y. Chu

Filing Date: Oct. 24, 2001

OFFICE OF PETITIONS

Group Art Unit: 1752

Title: Photopatternable Molecular Circuitry

Mail Stop ~~Petitioner~~/Director
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL LETTER FOR RESPONSE/AMENDMENT

Sir:

Transmitted herewith is/are the following in the above-identified application:

- () Response/Amendment () Petition to extend time to respond
() New fee as calculated below () Supplemental Declaration
() No additional fee
(X) Other: Petition to Withdraw Holding of Abandonment (fee \$ N/A)

CLAIMS AS AMENDED BY OTHER THAN A SMALL ENTITY						
(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT	(3) NUMBER EXTRA	(4) HIGHEST NUMBER PREVIOUSLY PAID FOR	(5) PRESENT EXTRA	(6) RATE	(7) ADDITIONAL FEES
TOTAL CLAIMS	10	MINUS	41	= 0	X \$50	\$ 0
INDEP. CLAIMS	1	MINUS	3	= 0	X \$200	\$ 0
[] FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM					+ \$360	\$ 0
EXTENSION FEE	1ST MONTH \$120.00	2ND MONTH \$450.00	3RD MONTH \$1020.00	4TH MONTH \$1590.00		\$ 0
OTHER FEES						\$
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT						\$ 0

Charge \$ 0 to Deposit Account 08-2025. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16, 1.17, 1.19, 1.20 and 1.21. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

Patricia A. Beck et al

By

David W. Collins

Attorney/Agent for Applicant(s)
Reg. No. 26857

(X) I hereby certify that this paper is being transmitted
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Number of pages: 23

Typed Name: L.D. Raphael

Signature:

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APR 24 2006

OFFICE OF PETITIONS^{PATENT}
PD-10003472-1**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Confirmation No. 4353

PATRICIA A. BECK ET AL

Serial No. ~~10/01,576~~ 10/601756

Group Art Unit: 1752

Filed: October 24, 2001

Examiner: John S. Y. Chu

For: PHOTOPATTERNABLE MOLECULAR CIRCUITRY

Mail Stop Petition

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

PETITION TO WITHDRAW HOLDING OF ABANDONMENT UNDER 37 CFR 1.181(a)

Sir:

This Petition to withdraw a holding of abandonment is being filed as a result of a Notice of Abandonment dated March 27, 2006. This Petition is being filed within two (2) months thereof.

The abandonment is apparently predicated upon the failure of the Patent Office to receive a response to the non-final rejection dated August 9, 2005, which would have been due on November 9, 2005 (shortened statutory three month period). However, Applicants in fact mailed an Amendment to the Patent Office on November 8, 2005, in response to the Office Action, as evidenced by (a) the enclosed copy of the Express Mail receipt, showing receipt in the U.S. Postal Service system on November 8, 2005, of documents related to Applicants' docket number PD-10003472-1 and (b) the enclosed copy of Applicants' return post card receipt, showing receipt of Applicants' Amendment in the Patent Office on November 8, 2005 ("OIP NOV 08, 2005").

Serial No. 10/001,756..... Page 2

M.P.E.P. §711.03(c)(I) sets forth the procedures to be followed in these circumstances. First, no fee is required of Applicants [M.P.E.P. §711.03(c)(I)]. Second, where there is disagreement as to whether the application is in fact abandoned, then the appropriate course of action is a petition under 37 CFR 1.181(a) [M.P.E.P. §711.03(c)(I)].

In addition to the proof that Applicants actually timely submitted their Amendment, as indicated above, Applicants provide herewith a copy of the Amendment as mailed to the Patent Office on November 8, 2005.

It is respectfully submitted that the enclosed copies of the indicated documents establish that Applicants timely responded to the Office Action dated August 9, 2005. Accordingly, Applicants request a withdrawal of any holding of abandonment and, further, that prosecution in this application be resumed.

Respectfully submitted,

April 24, 2006



David W. Collins

Reg. No. 26,857

Attorney for Applicants

512 E. Whitehouse Canyon Rd.
Suite 100
Green Valley, AZ 85614

Telephone calls may be made to:
(520) 399-3203

Label 11-F, April 20, 2006

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OFFICE OF PETITIONS



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Dear Madam/Sir:

Express Mail Label: EV 663102995

Please acknowledge receipt of the following document(s) re U.S. Patent Application Docket No. 10003472-1; Atty: David W. Collins Serial No. 107001, filed October 24, 2001

Inventor(s): Patricia M. Beck, et al.

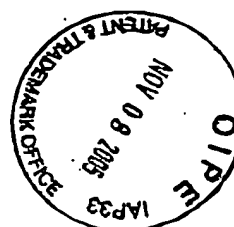
Title: Photopatternable Molecular Circuitry

Document(s): ☒ Amendment Transmittal Letter
☒ Certificate of Mailing
☒ Amendment
☒ Two receipt postcards

Date of Mailing: November 8, 2005

HP D-2K049

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512 E Whitehouse Canyon Rd., Ste. 100
Green Valley, AZ 85614

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P. O. Box 272400
Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 10003472-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Patricia A. Beck et al

FAX RECEIVED

Confirmation No.: 4363

Application No.: 10/001756

APR 24 2006

Examiner: J.S.Y. Chu

Filing Date: Oct. 24, 2001

Group Art Unit: 1752

Title: Photopatternable Molecular Circuitry

OFFICE OF PETITIONS

EV665302995US

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Mail Stop Amendment
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL LETTER FOR RESPONSE/AMENDMENT

Sir:

Transmitted herewith is/are the following in the above-identified application:

- (X) Response/Amendment () Petition to extend time to respond
() New fee as calculated below () Supplemental Declaration
() No additional fee
() Other: _____ (fee \$ _____)

CLAIMS AS AMENDED BY OTHER THAN A SMALL ENTITY						
(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT	(3) NUMBER EXTRA	(4) HIGHEST NUMBER PREVIOUSLY PAID FOR	(5) PRESENT EXTRA	(6) RATE	(7) ADDITIONAL FEES
TOTAL CLAIMS	10	MINUS	41	= 0	X \$50	\$ 0
INDEP. CLAIMS	1	MINUS	3	= 0	X \$200	\$ 0
[] FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM					+ \$360	\$ 0
EXTENSION FEE	1ST MONTH \$120.00	2ND MONTH \$450.00	3RD MONTH \$1020.00	4TH MONTH \$1590.00		\$ 0
OTHER FEES						\$
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT						\$ 0

Charge \$ 0 to Deposit Account 08-2025. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

"Express Mail" label no. E/ 665302995

Date of Deposit Nov. 8, 2005

I hereby certify that this is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to: Commissioner for Patents, Alexandria, VA 22313-1450

By L.D. Raphael
Typed Name: L.D. Raphael

Respectfully submitted,

Patricia A. Beck et al

By David W. Collins

David W. Collins

Attorney/Agent for Applicant(s)

Reg. No. 26857

Date: Nov. 8, 2005

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PATENT

PD-1000:472-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Confirmation No.: 4353

PATRICIA A. BECK ET AL

Serial No.: 10/001,756

Group Art Unit: 1752

Filed: October 24, 2001

Examiner: John S. Y. Chu

For: PHOTOPATTERNABLE MOLECULAR CIRCUITRY

MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

AMENDMENT

Sir:

This is in response to the Office Action dated August 9, 2005, rejecting Claims 1, 6, 8, and 9, objecting to Claims 10-15, and withdrawing Claims 16-45 in the above-identified patent application. Amendments to the claims start on page 2 hereof and Remarks start on page 15 hereof.

COPY

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AMENDMENTS TO THE CLAIMS

The following is a listing of all claims in the application, wherein Claim 1 is amended and Claims 16-45 are cancelled as follows:

1. (currently amended) A bistable molecule for a multiple electrode device, said multiple electrode device comprising at least one pair of electrodes that form at least one junction and at least one said bistable molecule connecting said pair of electrodes in said junction, said junction having a functional dimension in nanometers or micrometers, said bistable molecule including at least one photosensitive, photodecomposable functional group, wherein said bistable molecule comprises a main chain and at least one pendant group and wherein at least one photosensitive, photodecomposable functional group is attached either to said main chain or to said pendant group, said bistable molecule exhibiting bistability irrespective of the presence or absence of said at least one photosensitive, photodecomposable group.

Claims 2-5 (canceled)

6. (original) The bistable molecule of Claim 1 wherein said photosensitive functional group is sensitive to ultraviolet, electron-beam, or X-ray radiation.

7. (canceled)

8. (previously presented) The bistable molecule of Claim 1 wherein one said photosensitive group is attached to at least one end of said bistable molecule.

9. (previously presented) The bistable molecule of Claim 1 wherein said photosensitive group is selected from the group consisting of α -carboxy-2-nitrobenzyl; 1-(2-nitrophenyl)ethyl; 4,5-dimethoxy-2-nitrobenzyl; 1-(4,5-dimethoxy-2-nitrophenyl)ethyl; (4,5-dimethoxy-2-nitrobenzyloxy)carbonyl; 5-carboxymethoxy-2-nitrobenzyl; [(5-carboxymethoxy-2-nitrobenzyl)oxy]carbonyl; desoxybenzoil; and anthraquinon-2-ylmethoxycarbonyl.

COPY

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10. (original) The bistable molecule of Claim 1 wherein said molecule evidences switching based on electric (E) field induced band gap change, selected from the group consisting of:

5 (1) an electric field ("E-field") induced rotation of at least one rotatable section (rotor) of a molecule to change the band gap of the molecule (rotor/stator configuration);

(2) E-field-induced charge separation or recombination of the molecule via chemical bonding change to alter the band gap:

10 (2a) E-field-induced band gap change caused by the change of extended conjugation via charge separation or recombination accompanied by increasing or decreasing π - and/or p-electron localization;

(2b) E-field-induced band gap change caused by a change of extended conjugation via charge separation or recombination and π -bond breaking or formation; and

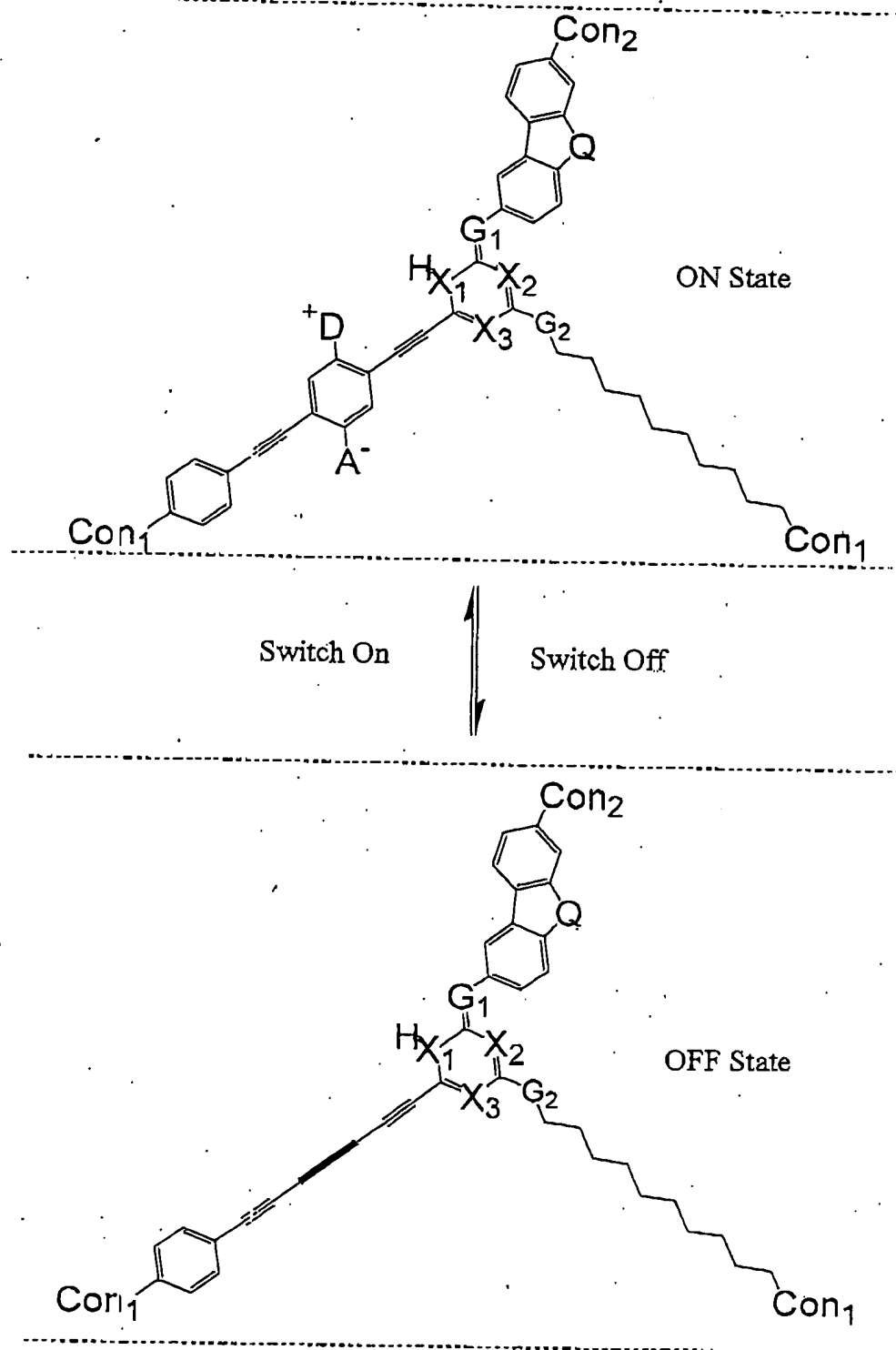
(3) E-field-induced band gap change via molecular folding or stretching.

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Page 4

11. (original) The bistable molecule of Claim 10 wherein said bistable molecule com-



15 prisms:
where:

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A⁻ is an Acceptor group comprising an electron-withdrawing group selected from the group consisting of (a) carboxylic acid and its derivatives, (b) sulfuric acid and its derivatives, (c) phosphoric acid and its derivatives, (d) nitro, (e) nitrile, (f) hetero atoms selected from the group consisting of N, O, S, P, F, Cl, and Br, (g) functional groups with at least one of said hetero atoms, (h) saturated or unsaturated hydrocarbons, and (i) substituted hydrocarbons;

D⁺ is a Donor group comprising an electron-donating group selected from the group consisting of (a) hydrogen, (b) amines, (c) OH, (d) SH; (e) ethers, (f) saturated or unsaturated hydrocarbons, (g) substituted hydrocarbons, and (h) functional groups with at least one hetero atom selected from the group consisting of B, Si, I, N, O, S, and P, wherein said Donor group is more electropositive than said Acceptor group;

Con₁ and Con₂ are connecting units between one molecule and another molecule or between a molecule and a substrate, said connecting units containing an attaching unit and at least one of said connecting units containing said photosensitive group, wherein said photosensitive group is selected from the group consisting of photosensitive azo, photosensitive ester, photosensitive ether, photosensitive amide, photosensitive imide, photosensitive amine, photosensitive imine, photosensitive carbonate, photosensitive carbamate, photosensitive thio-ether, photosensitive thio-ester, photosensitive isocyanides, and photosensitive heteroring systems with at least one hetero-atom selected from the group consisting of N, O, S, B, and P, and wherein the attaching unit is selected from the group consisting of (a) carboxylic acid and its derivatives, (b) sulfuric acid and its derivatives, (c) phosphoric acid and its derivatives, (d) hetero atoms selected from the group consisting of N, O, S, B, Se, and P, (e) functional groups with at least one of said hetero atoms (f) hydrocarbons, and (g) substituted hydrocarbons;

X₁, X₂, X₃ are tuning units built into the ring system which serve to tune the electronic properties, the optical properties, or both, of the bistable molecule as well those of the ring system undergo a smooth and desired tautomerization transition under the influence of an applied external E-field, wherein the tuning units are selected from the group consisting of a hetero atom selected from the group consisting of N, P, and As; hydrocarbons; and substituted hydrocarbons;

G₁ and G₂ are bridging groups for connecting stator and rotor portions of said bistable molecule or for connecting two or more fragments to achieve desired molecular properties,

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50 wherein the bridging groups are either (a) selected from the group consisting of (i) hetero atoms selected from the group consisting of N, O, S, and P; (ii) functional groups with at least one of said hetero atoms; (iii) saturated or unsaturated hydrocarbons; and (iv) substituted hydrocarbons or (b) selected from the group consisting of a single atom bridge and a direct sigma bond between said rotor and stator portions;

55 Q is a connecting unit between two phenyl rings, selected from the group consisting of S, O, NH, NR, hydrocarbons, and substituted hydrocarbons; and

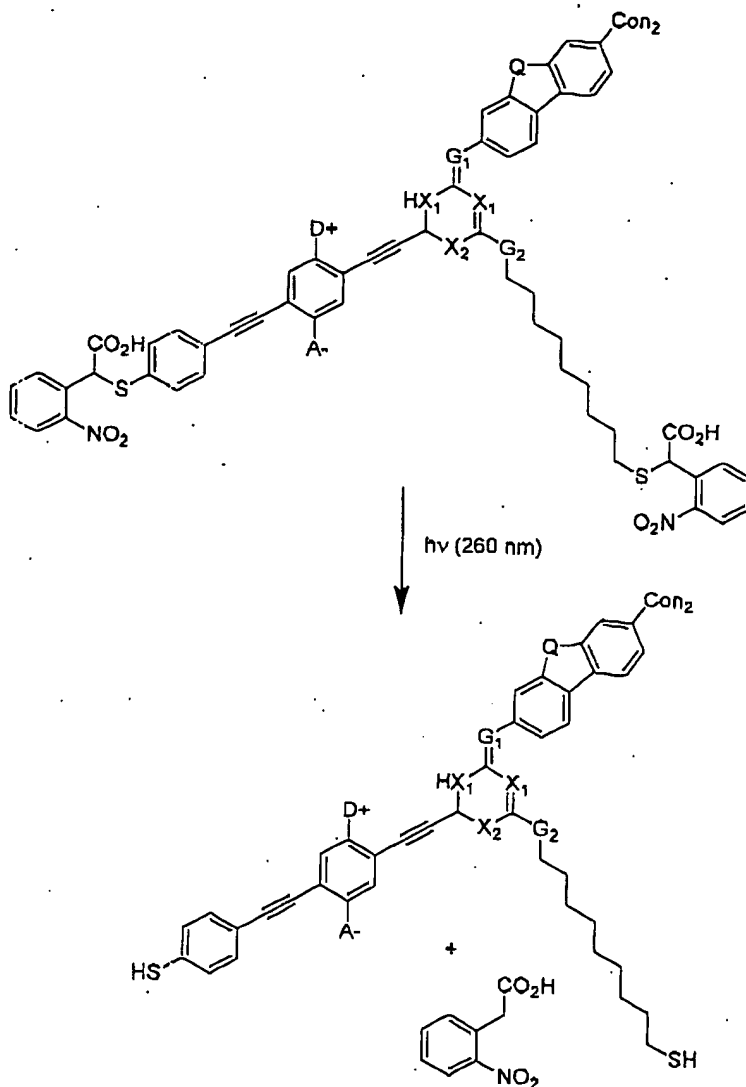
H is a hydrogen atom.

12. (original) The bistable molecule of Claim 10 wherein said bistable molecule comprises:

COPY

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Page 7



5 where:

A⁻ is an Acceptor group comprising an electron-withdrawing group selected from the group consisting of (a) carboxylic acid and its derivatives, (b) sulfuric acid and its derivatives, (c) phosphoric acid and its derivatives, (d) nitro, (e) nitrile, (f) hetero atoms selected from the group consisting of N, O, S, P, F, Cl, and Br, (g) functional groups with at least one of said hetero atoms, (h) saturated or unsaturated hydrocarbons, and (i) substituted hydrocarbons;

D⁺ is a Donor group comprising an electron-donating group selected from the group consisting of (a) hydrogen, (b) amines, (c) OH, (d) SH, (e) ethers, (f) saturated or unsaturated hydrocarbons, (g) substituted hydrocarbons, and (h) functional groups with at least one hetero

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15 atom selected from the group consisting of B, Si, I, N, O, S, and P, wherein said Donor group is more electropositive than said Acceptor group;

Con₂ is a connecting unit between one molecule and another molecule or between a molecule and a substrate, said connecting unit containing an attaching unit and said photosensitive group, wherein said photosensitive group is selected from the group consisting of photosensitive azo, photosensitive ester, photosensitive ether, photosensitive amide, photosensitive imide, photosensitive amine, photosensitive imine, photosensitive carbonate, photosensitive carbamate, photosensitive thio-ether, photosensitive thio-ester, photosensitive isocyanides, and photosensitive hetero-ring systems with at least one hetero-atom selected from the group consisting of N, O, S, B, and P and wherein the attaching unit is selected from the group consisting of carboxylic acid and its derivatives; sulfuric acid and its derivatives; phosphoric acid and its derivatives; hetero atoms selected from the group consisting of N, O, S, B, Se, and P functional groups with at least one of said hetero atoms; hydrocarbons; and substituted hydrocarbons;

30 X₁, X₂, X₃ are tuning units built into the ring system which serve to tune the electronic properties, the optical properties, or both, of the bistable molecule as well as to that the ring system undergoes a smooth and desired tautomerization transition under the influence of an applied external E-field, wherein the tuning units are selected from the group consisting of a hetero atom selected from the group consisting of N, P, and As; hydrocarbons; and substituted hydrocarbons;

35 G₁ and G₂ are bridging groups for connecting stator and rotor portions of said bistable molecule or for connecting two or more fragments to achieve desired molecular properties, wherein the bridging groups are either (a) selected from the group consisting of (i) hetero atoms selected from the group consisting of N, O, S, and P; (ii) functional groups with at least one of said hetero atoms; (iii) saturated or unsaturated hydrocarbons; and (iv) substituted hydrocarbons or (b) selected from the group consisting of a single atom bridge and a direct sigma bond between said rotor and stator portions;

40 Q is a connecting unit between two phenyl rings, selected from the group consisting of S, O, NH, NR, hydrocarbons, and substituted hydrocarbons; and

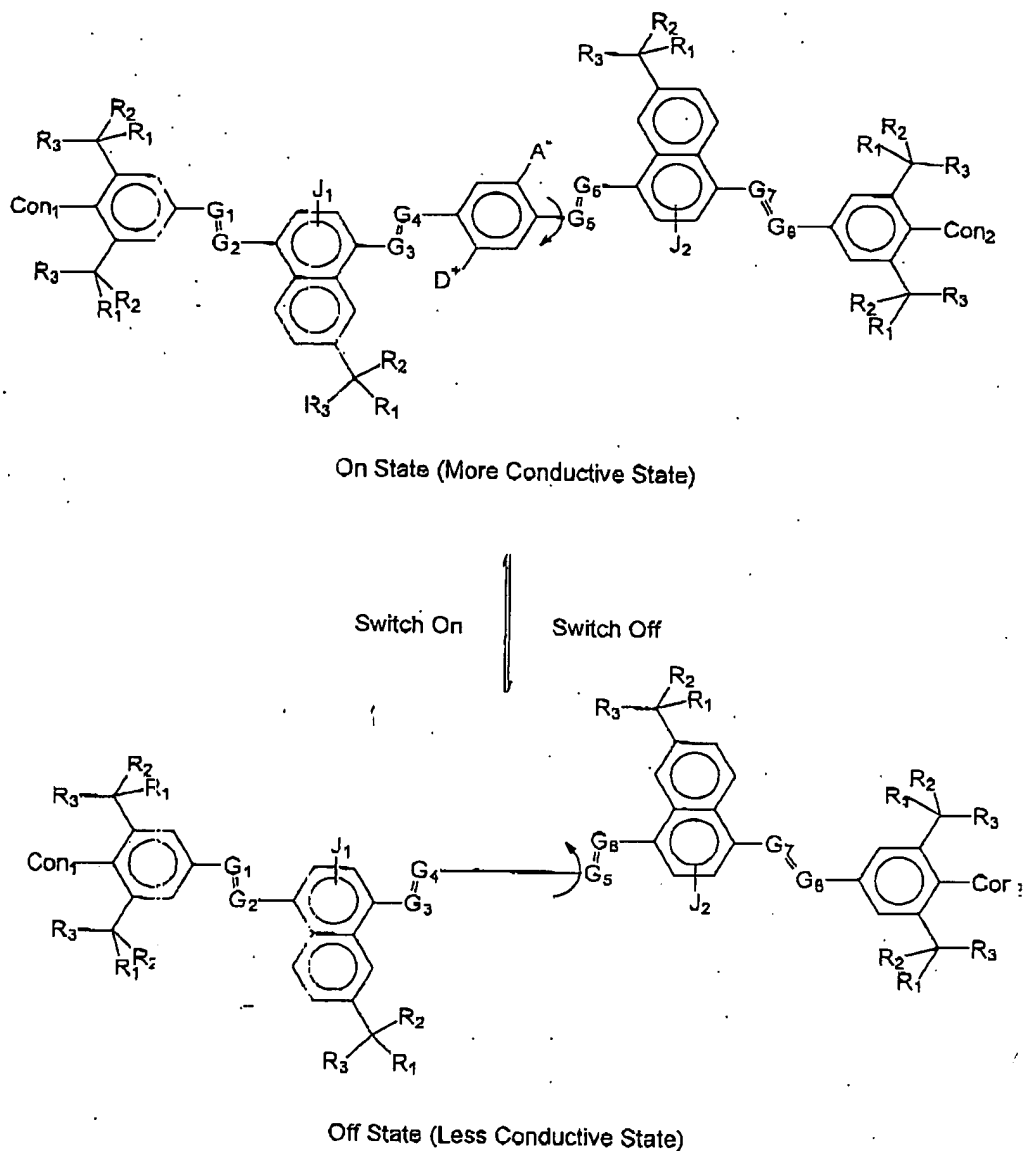
H is a hydrogen atom.

COPY

Serial No. 10/001,756

Page: 9

13. (original) The bistable molecule of Claim 10 wherein said bistable molecule comprises:



where:

5 A* is an Acceptor group comprising an electron-withdrawing group selected from the group consisting of (a) carboxylic acid and its derivatives, (b) sulfuric acid and its derivatives, (c) phosphoric acid and its derivatives, (d) nitro, (e) nitrile, (f) hetero atoms selected from the group consisting of N, O, S, P, F, Cl, and Br, (g) functional groups with at least one of said hetero atoms, (h) saturated or unsaturated hydrocarbons, and (i) substituted hydrocarbons;

10

COPY

Serial No. 10/001,756

Page 10

D^+ is a Donor group comprising an electron-donating group selected from the group consisting of (a) hydrogen, (b) amines, (c) OH, (d) SH, (e) ethers, (f) saturated or unsaturated hydrocarbons, (g) substituted hydrocarbons, and (h) functional groups with at least one hetero atom selected from the group consisting of B, Si, I, N, O, S, and P; wherein said Donor group is more electropositive than said Acceptor group;

$G_1=G_2$, $G_3=G_4$, $G_5=G_6$, and $G_7=G_8$ are bridging groups for connecting stator and rotor portions of said bistable molecule or for connecting two or more conjugated rings to achieve desired electronic properties, wherein the bridging groups are either (a) photosensitive functional groups or (b) selected from the group consisting of (i) hetero atoms selected from the group consisting of N, O, S, and P; (ii) functional groups with at least one of said hetero atoms; (iii) saturated or unsaturated hydrocarbons; and (iv) substituted hydrocarbons, or (c) selected from the group consisting of a single atom bridge and a direct sigma bond between said rotor and stator portions;

Con_1 and Con_2 are connecting units between one molecule and another molecule or between a molecule and a substrate, said connecting units containing an attaching unit and at least one of said connecting units containing said photosensitive group, wherein said photosensitive group is selected from the group consisting of photosensitive azo, photosensitive ester, photosensitive ether, photosensitive amide, photosensitive imide, photosensitive amine, photosensitive imine, photosensitive carbonate, photosensitive carbamate, photosensitive thio-ether, photosensitive thio-ester, photosensitive isocyanides, and photosensitive heteroring systems with at least one hetero-atom selected from the group consisting of N, O, S, B, and P and wherein the attaching unit is selected from the group consisting of carboxylic acid and its derivatives; sulfuric acid and its derivatives; phosphoric acid and its derivatives; hetero atoms selected from the group consisting of N, O, S, B, Se, and P; functional groups with at least one of said hetero atoms; hydrocarbons, and substituted hydrocarbons;

R_1 , R_2 , and R_3 are spacing groups selected from the group consisting of (a) hydrogen, (b) saturated or unsaturated hydrocarbons, and (c) substituted hydrocarbons; and

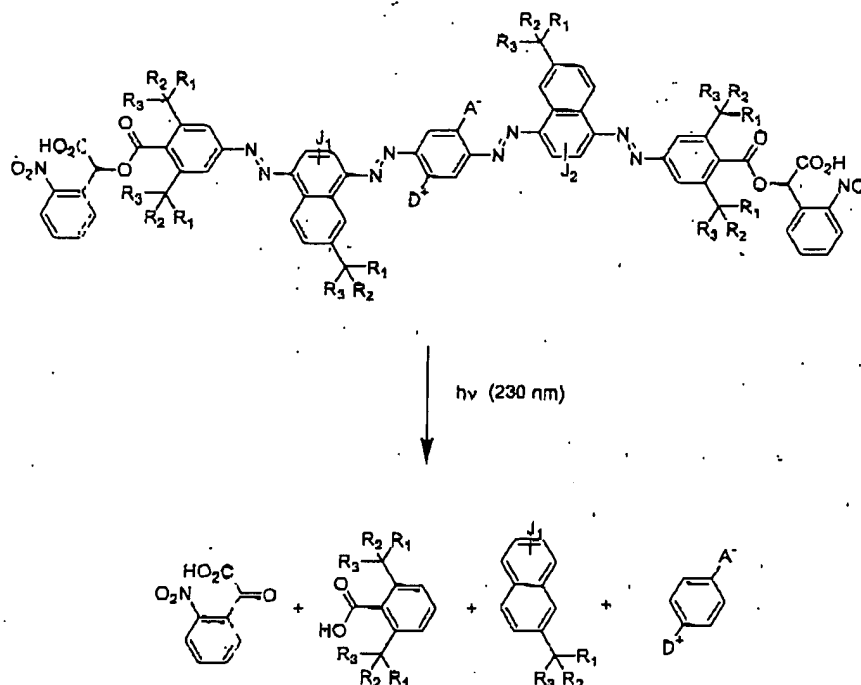
J_1 and J_2 are tuning groups to provide at least one appropriate functional effect selected from the group consisting of inductive effects, resonance effects, and steric effects, where said tuning groups are selected from the group consisting of (a) hydrogen, (b) hetero atoms selected from the group consisting of N, O, S, P, B, F, Cl, Br, and I, (c) functional

Serial No. 10/001,756

Page: 11

groups with at least one of said hetero atoms, (d) saturated or unsaturated hydrocarbons, and (e) substituted hydrocarbons.

14. (original) The bistable molecule of Claim 10 wherein said bistable molecule comprises:



5 where:

A^- is an Acceptor group comprising an electron-withdrawing group selected from the group consisting of (a) carboxylic acid and its derivatives, (b) sulfuric acid and its derivatives, (c) phosphoric acid and its derivatives, (d) nitro, (e) nitrile, (f) hetero atoms selected from the group consisting of N, O, S, P, F, Cl, and Br, (g) functional groups with at least one of said hetero atoms, (h) saturated or unsaturated hydrocarbons, and (i) substituted hydrocarbons;

Serial No. 10/001,756

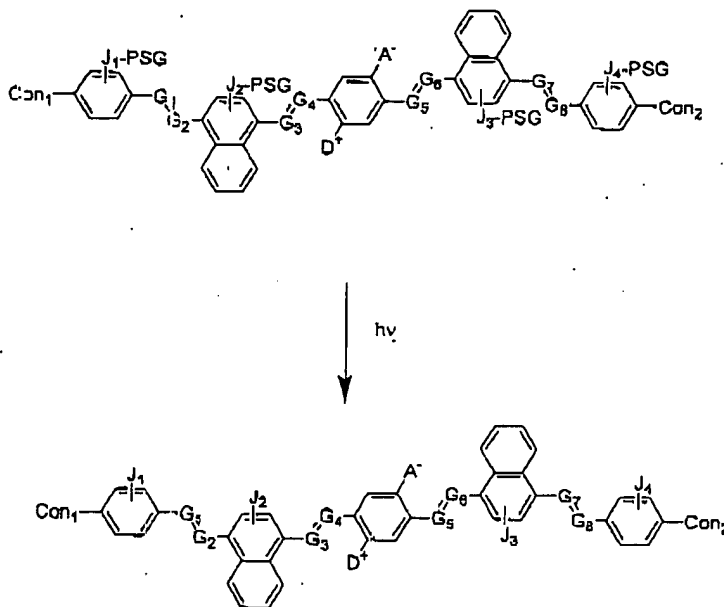
Page 12

D^+ is a Donor group comprising an electron-donating group selected from the group consisting of (a) hydrogen, (b) amines, (c) OH, (d) SH, (e) ethers, (f) saturated or unsaturated hydrocarbons, (g) substituted hydrocarbons, and (h) functional groups with at least one hetero atom selected from the group consisting of B, Si, I, N, O, S, and P; wherein said Donor group is more electropositive than said Acceptor group;

R_1 , R_2 , and R_3 are spacing groups selected from the group consisting of (a) hydrogen, (b) saturated or unsaturated hydrocarbons, and (c) substituted hydrocarbons; and

J_1 and J_2 are tuning groups to provide at least one appropriate functional effect selected from the group consisting of inductive effects, resonance effects, and steric effects, said tuning groups are selected from the group consisting of (a) hydrogen, (b) hetero atoms selected from the group consisting of N, O, S, P, B, F, Cl, Br, and I, (c) functional groups with at least one of said hetero atoms, (d) saturated or unsaturated hydrocarbons, and (e) substituted hydrocarbons.

15. (previously presented) The bistable molecule of Claim 10 wherein said bistable molecule comprises:



5 where:

COPY

Serial No. 10/001,756 Page 13

A^- is an Acceptor group comprising an electron-withdrawing group selected from the group consisting of (a) carboxylic acid and its derivatives, (b) sulfuric acid and its derivatives, (c) phosphoric acid and its derivatives, (d) nitro, (e) nitrile, (f) hetero atoms selected from the group consisting of N, O, S, P, F, Cl, and Br, (g) functional groups with at least one of said hetero atoms, (h) saturated or unsaturated hydrocarbons, and (i) substituted hydrocarbons;

D^+ is a Donor group comprising an electron-donating group selected from the group consisting of (a) hydrogen, (b) amines, (c) OH, (d) SH, (e) ethers, (f) saturated or unsaturated hydrocarbons, (g) substituted hydrocarbons; and (h) functional groups with at least one hetero atom selected from the group consisting of B, Si, I, N, O, S, and P; wherein said Donor group is more electropositive than said Acceptor group;

$G_1=G_2$, $G_3=G_4$, $G_5=G_6$, and $G_7=G_8$ are bridging groups for connecting stator and rotor portions of said bistable molecule or for connecting two or more conjugated rings to achieve desired electronic properties, wherein the bridging groups are either (a) photosensitive functional groups, or (b) selected from the group consisting of (i) hetero atoms selected from the group consisting of N, O, S, and P; (ii) functional groups with at least one of said hetero atoms; (iii) saturated or unsaturated hydrocarbons; and (iv) substituted hydrocarbons, or (c) selected from the group consisting of a single atom bridge and a direct sigma bond between said rotor and stator portions;

Con_1 and Con_2 are connecting units between one molecule and another molecule or between a molecule and a substrate, said connecting units containing an attaching unit and at least one of said connecting units containing said photosensitive group, wherein said photosensitive group is selected from the group consisting of photosensitive azo, photosensitive ester, photosensitive ether, photosensitive amide, photosensitive imide, photosensitive amine, photosensitive imine, photosensitive carbonate, photosensitive carbamate, photosensitive thio-ether, photosensitive thio-ester, photosensitive isocyanides, and photosensitive heteroring systems with at least one hetero-atom selected from the group consisting of N, O, S, B, and P and wherein the attaching unit is selected from the group consisting of carboxylic acid and its derivatives; sulfuric acid and its derivatives; phosphoric acid and its derivatives; hetero atoms selected from the group consisting of N, O, S, B, Se, and P; functional groups with at least one of said hetero atoms; hydrocarbons; and substituted hydrocarbons; and

COPY

Serial No. 10/001,756

Page: 14

40 J₁, J₂, J₃, and J₄ are tuning groups which contain solvent functional groups selected from the group consisting of OH, NHR, COOH, and CN, where R is alkyl or aryl, wherein J₁-PSG, J₂-PSG, J₃-PSG, and J₄-PSG are linkages of said tuning groups with said photosensitive groups and are selected from the group consisting of ether, ester, carbonate, amide, and carbamate linkages.

Claims 16-45: canceled.

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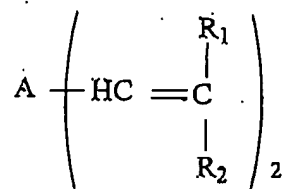
REMARKS

Claims 1, 6, and 8-15 remain in the application; Claims 16-45 have been canceled. Claim 1 is amended to emphasize distinctions over cited art.

Applicants appreciate that the rejections under 35 USC 112, second paragraph, have been withdrawn.

Claims 1, 6, 8, and 9 are rejected under 35 USC 102(b) as being anticipated by Van Allan et al (U.S. Patent 4,282,354).

Van Allan et al disclose an electrophoretic migration imaging process, involving materials having the structure



The materials are purportedly useful in electrophoretic migration imaging processes.

Applicants' Claim 1, as amended, recites

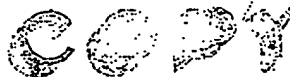
1. A bistable molecule for a multiple electrode device, said multiple electrode device comprising at least one pair of electrodes that form at least one junction and at least one said bistable molecule connecting said pair of electrodes in said junction, said junction having a functional dimension in nanometers or micrometers, said bistable molecule including at least one photosensitive, *photodecomposable* functional group, wherein said bistable molecule comprises a main chain and at least one pendant group and wherein at least one photosensitive, photodecomposable functional group is attached either to said main chain or to said pendant group, said bistable molecule exhibiting bistability irrespective of the presence or absence of said at least one photosensitive, photodecomposable group.
(Emphasis added.)

The Examiner reproduces Table 1 from Van Allan and argues that the compounds listed therein anticipate the recited scope for the claimed bistable molecule.

First, the arguments presented with regard to Van Allan et al in Applicants' previous Amendment filed May 12, 2005, obtain here as well.

Second, the following exposition is provided for the benefit of the Examiner:

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Applicants' invention is directed to how to make photo-patternable molecular circuitry. Van Allan et al is directed to electro-photography.

Van Allan et al disclose the use of some photosensitive chemicals to generate charges or change charge polarity of the molecules first. Then they use an electrophoretic method to migrate the photo-charged chemical to one of the surfaces to obtain an image. On the other hand, Applicants use their device molecules with photosensitive groups to deposit a film on electrodes first, and then expose portions of the bistable molecular film to irradiation (ultraviolet, electron-beam, or X-ray), decompose the exposed molecular material, and remove unwanted portions of the bistable molecular film to provide a photo-patterned molecular film after that.

The key difference is that the photo-sensitive materials of Van Allan et al are *photo-chargeable* materials, whereas Applicants' photosensitive materials are *photo-decomposable* materials. The molecules of Van Allan et al are merely electrically charged during the process and do not undergo material decomposition, whereas Applicants' molecules are changed to a completely new chemical species after exposure to the irradiation.

Another difference is that Van Allan et al use an electrophoretic method to generate a pattern for consumer printing or copying purpose, whereas Applicants use a conventional lithographic process incorporated with their novel photo-decomposable molecular device to generate molecular circuitry and use them for molecular electronics or molecular optics.

It does not matter whether or not the molecule of Van Allen et al is bistable or looks bistable; the molecules of Van Allen et al have totally different properties from Applicants' molecules, as well as totally different applications.

For the molecules of Van Allan et al, whether or not some portion of the molecule can rotate or twist is unimportant; all that those portions of the molecule do is to combine to form a certain permanent color with an easily chargeable structure, so that when they are electrically photo-charged, the photo-charged materials can undergo an electrophoretic migration from one electrode surface to another electrode surface to form an image. For Applicants' device molecules, intra-molecular twisting or rotation is their unique property imparted by electric-field (E-field) induced molecular switching. Both optical and electrical properties of the molecular device will be changed under the influence of an external electric field. Applicants use their unique method of patterning their molecular circuitry for their switchable molecular electronics applications.

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Summarizing, Van Allan et al utterly fail to disclose or even remotely suggest a bistable molecule including at least one photosensitive, photodecomposable functional group. Applicants' Claim 1 is amended to distinguish the aspect of photodecomposition, as disclosed in, for example, paragraphs 0065, 0066, 0072, 0073, 0075, 0079, 0081, 0104, 0122, 0123, and 0136, as well as FIG. 6 and the text associated therewith.

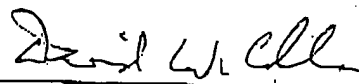
Reconsideration of the rejection of Claims 1, 6, 8, and 9, as amended, under 35 USC 102(b) as being anticipated by Van Allan et al is respectfully requested.

The Examiner indicates that Claims 10-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants appreciate that these claims are allowable. Applicants, however, urge that the limitations now recited in Claim 1 render this claim allowable over each of Van Allan et al and Fay et al.

The application, as amended, is considered to be in condition for allowance. The Examiner is respectfully requested to take such action. If the Examiner has any questions, he is invited to contact the undersigned at the below-listed telephone number. HOWEVER, PLEASE CONTINUE TO ADDRESS ALL FURTHER WRITTEN CORRESPONDENCE TO: IP ADMINISTRATION, LEGAL DEPARTMENT, M/S 35, HEWLETT-PACKARD COMPANY, P.O. BOX 272400, FORT COLLINS, CO 80527-2400.

Respectfully submitted,

November 8, 2005



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